



United States Department of the Interior

BUREAU OF RECLAMATION
Mid-Pacific Region
Central California Area Office
7794 Folsom Dam Road
Folsom, CA 95630-1799

JAN 18 2011

IN REPLY REFER TO:

CC-414
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Mr. Patrick Morris
Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, Suite 200
Rancho Cordova, California 95670

Subject: Methyl-Mercury Total Maximum Daily Load (TMDL) Developmental Documents
Lower American River and Lake Natoma Mercury Control Program Straw Proposal,
September 2010 and Appendix B – Guiding Principles, June 2010

Dear Mr. Morris:

The Bureau of Reclamation's Central California Area Office would like to thank the Central Valley Regional Water Quality Control Board (Regional Water Board) for continued collaboration on the development of a methyl-mercury control program for the lower American River Basin. Reclamation reviewed the subject documents and understands these initial proposals will lead to a more robust analysis of mercury and methyl mercury impairment for the entire American River Basin, which now includes water bodies upstream of Folsom Reservoir.

Reclamation commends the Regional Water Board for expanding the project area to include the watershed that drains into Folsom Reservoir as part of a methyl-mercury TMDL control program to address the impairment on a watershed level. Several staff attended the recent stakeholder group meetings that were held in Auburn and Placerville to introduce upstream interests to the TMDL control program. We understand the straw proposal will be revised in the future to reflect the input from these groups. We are submitting the enclosed comments on the September 2010 Straw Proposal and June 2010 Guiding Principles and have included some comments that tie into discussions from the two recent stakeholder group meetings for further discussion and consideration. We look forward to working with your staff to address these concerns.

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If you have any questions, please feel free to contact Mr. Pete Vonich, Natural Resources Specialist, at 916-989-7265 or pvonich@usbr.gov.

Sincerely,

A handwritten signature in dark ink, appearing to read "Michael R. Finnegan", with a horizontal line extending to the right.

Michael R. Finnegan
Area Manager

Enclosure

Appendix B – Guiding Principles – Comments

Page	Comments
B-1	<p>Item 1 – “all sources” – All sources of mercury should include the watershed associated with the water bodies. For example, all lands that drain into Folsom Lake and Lake Natoma should be included as potential sources of mercury. Also, during the Phase 1 studies, there is a need to better understand the mercury methylation process in foothill reservoirs – factors that drive methylation or demethylation.</p> <p>“reasonable control options” – Please define and provide some examples of “reasonable” controls measure that have been implemented in other project areas. An implementation measure that is reasonable for one beneficial use could conflict or compete with another beneficial use in the same watershed or water body.</p>
B-1	<p>Item 2 – Provide the process on how the Board intends to develop the knowledge base for methyl mercury production in foothill reservoirs of highly managed systems. The linkage between water column methyl mercury (MeHg) concentration and methyl mercury in fish tissue are not clear. A starting point could include gathering and categorizing existing total mercury/MeHg data, monitoring assessments, and reports in the basin and also providing some type of forum where stakeholders can possibly participate in developing the MeHg knowledge base.</p>
B-1	<p>Item 3 – In addition to stating the current knowledge, the Basin Plan amendment and staff report should include the information gaps discovered and suggested studies to provide the necessary information. At present there does not appear to be a consensus on the baseline concentration for mercury in fish tissue just from atmospheric deposition, such as waterbodies located above any historic mining activity or known sources of terrestrial mercury. Such a baseline is necessary to determine a reasonable target for a control program.</p>
B-2	<p>Item 4 – An adaptive management process is a reasonable approach but all stakeholders need to be involved from the beginning and not brought into the process based on regulatory priority. The Board needs to identify all potential responsible parties and allow them the opportunity to be involved in the development of the control and implementation program.</p> <p>Reclamation commends the Board’s decision to move the mercury control program upstream of the foothill reservoirs and to include upper the watershed. Development of a control program that encompasses all stakeholders from the start will meet the goal of Item 6 – “... having a program that incorporates long term stakeholder involvement in the control studies ...”</p>
B-2	<p>Item 5 – Is the “Guiding Principles” specific to the American River Basin or is it tied to the Delta Mercury TMDL? If it is for the American River Basin, all references to the Delta should be removed. If the success of this control program is tied to the public health impacts of mercury in Delta fish, this control program will not be effective.</p>
B-2	<p>Item 8 – The linkage analysis and fish tissue objective for this basin must be based on most current science for this particular type of system. The foundational information for</p>

	the control program will set the stage for the phase 1 and phase 2 studies and the program of implementation. Moving forward without a strong scientific basis will delay progress and waste resources.
B-2	<p>Item 11 – “<i>should include all sources downstream of major dams.</i>” This item should be change to the following, “... <i>should include all sources within the watershed.</i>”</p> <p>Bullet 3: The bullet should be changed to reflect Folsom upstream tributaries.</p> <p>Bullet 5: What are the responsibilities of other public and private landowners that have discharges that contribute to mercury or methyl mercury impairment?</p> <p>In assembling the current knowledge base for the basin, Board staff should include the report written by D.G. Slotton (<i>Gold Mining Impacts on Food Chain Mercury in Northwestern Sierra Nevada Streams</i>, Technical Completion Report, Project Number: W-816, August 1995).</p>
B-3	<p>Item 12 – To add more specificity, habitat restoration also includes fishery needs – flow, temps, gravel, etc. Power operation is also an identified beneficial use for this water body and will need to be protected. Recreational activities could also be considered a beneficial use. In evaluating the level of protection needed for this mercury TMDL, all beneficial uses and interests need to be examined with adequate discussions on the priorities and tradeoffs associated with a range of numeric targets.</p>

Specific Comments on Straw Proposal Dated September 3, 2010

Page	Comments
Pg. 1	<p><u>Straw proposal bullet.</u> A comment included in the <i>Guiding Principles</i> document related to the phase 1 studies is, “Some stakeholders believe that we may not know if attainability of allocations and objectives will be feasible at the end of Phase 1.” Therefore this straw proposal should include some reference to the uncertainty that numeric targets and implementation options would necessarily follow phase 1 studies. There may be intermediate steps in between the Phase 1 studies and the allocation process as additional information becomes available on MeHg production and control.</p>
Pg. 2	<p>Paragraph 2 – Can the sections of the Clean Water Act and the Porter Cologne Water Quality Control Act be referenced here, or will this background be contained in another document?</p>
Pg. 2	<p>Paragraph 3 – A graphic timeline with major milestones and duration of each task would be helpful; how does this align with the completion of the CEQA evaluation/cost considerations?</p>

Pg. 2	<p>Paragraph 5 – “Mercury levels vary by fish size, species”... and <u>waterbody</u>. The amount of mercury that a person takes <u>in from consuming locally caught fish from an impaired water body</u> depends on the amount, type, <u>and size</u> of fish consumed. Similarly, key variables in determining a safe level of mercury in fish are the amounts of fish eaten (consumption rate) and the type <u>and size</u> of fish.</p> <p>These fish characteristics maybe related to bioabsorption rates in fish tissue. Does Board staff have any information on the connections of fish characteristics to bioaccumulation in the food web?</p>
Pg. 3	<p>Figure 1. As per the label below the figure “Average mercury concentrations in fish caught between Nimbus Dam and Discovery Park”, are there sampling locations all along this area or only at the two distinct locations noted in the highlighted text below: i.e., Lake Natoma and near Discovery Park. Without additional information, such and fish size and age or number of tested fish in each category, this graphic does not provide much information. What is the source of this information?</p>
Pg. 3 onto 4	Provide an example of a trophic level 2 fish in this basin.
Pg. 3 onto 4	Scallops and tuna are grouped as “fish”. Scallops are a shellfish.
Pg. 3 onto 4	<p>“...Whether or not people also eat some commercial fish...” – It would be helpful to describe the significance of a mixed a diet composed of commercially purchased and wild caught fish? Are the levels of mercury in commercial fish and shellfish known? What do you mean by “commercial fish”—are both wild caught and hatchery fish within this category?</p>
Pg. 4	<p>Table 1. Target Options for Protection of Human Health. In the legend beneath—“...from lower American River fish is the USEPA reference dose minus the methylmercury from commercial fish...” - What are these commercial methylmercury levels—is there a reference for where this can be found? How will knowing this help establish water quality objectives for the watershed?</p>
Pg. 5	<p>Paragraph 3. “Scenario B.2 may be an appropriate fish tissue target because it would produce significant improvement in the fish eaten by people (45% reduction of existing levels).” Is this level of protective reasonable and/or achievable—what is this based on?</p> <p>The assertion is made that the target appears technically achievable, relative to mercury concentrations seen in relatively uncontaminated areas. However, were the levels from the uncontaminated areas similar to the LAR project area – foothill water shed with a fresh, clear, cold water system with similar water chemistry, environmental conditions, food source, and fish species?</p> <p>What is the appropriate background or baseline fish tissue level for mercury? This baseline should then be the feasible target for the program. If the baseline is at a level where a program cannot achieve a 45% reduction, the program is flawed from the onset. Since fish bio-accumulate mercury through their diet, the appropriate background fish should be the same species with a similar invertebrate diet.</p>
Pg. 5	First bullet under SOURCE ANALYSIS – remove <u>“Delta”</u> food web...

	Please provide the citations for the studies are being referenced
Pg. 6	2nd Bullet. USEPA's CTR criterion (Please provide the reference for this criterion.)
Pg. 6	<p>3rd bullet – a 44% reduction for the Sacramento River inflows may be easier to obtain from other tributaries that contribute a greater load to the Sacramento River such as the Yuba River or the Feather River.</p> <p>How would the TMDLs for these river systems be coordinated into the TMDL for the LAR and Lake Natoma? What process (es) determine whether or not a portion of the load reduction is assigned to the outflows from American River watershed?</p>
Pg. 6	<p>4th bullet – The document alludes to the density of mines in the watershed as a source for mercury, therefore, the land owners, the State Lands Commission and/or other entities responsible for abandoned mines should be listed as responsible parties to the impairment of the water bodies.</p> <p>“The April 2010 BPA indicated that initial reduction efforts should focus on watersheds that contribute the most mercury-contaminated sediment to the Delta and Yolo Bypass, such as the Cache Creek, American River, Putah Creek, Cosumnes River, and Feather River watersheds...” Of the watersheds listed, the American River probably contributes the least mercury contaminated sediments and has the least amount of data pertaining to mercury. It makes more sense to begin in a watershed with a robust dataset so sound linkages can be developed.</p>
Pg. 6	<p>Folsom Lake does not contribute to inorganic mercury and should not be listed as a source. The mercury is coming from the watershed and the atmosphere and not the reservoir.</p> <p>“Unidentified sources could include elemental mercury in the lakebed that is re-suspended during high flow and flood events. Elevated loads of methylmercury are from Folsom Dam, upstream wetlands, <u>upstream tributaries</u>, urban runoff, and methylmercury flux from sediment in open-water areas.”</p>
Pg. 7&8	<p>Table 2, 3, 4, 5, and 6 – Please provide the source of the data come and the period of record. Reclamation has total mercury data spanning many years that shows different values for Folsom. Reclamation also has data from other locations on the American River such as Rainbow Bridge and Negro Bar.</p> <p>Board staff conveyed that the 35% load contribution from Folsom Dam was derived from limited data collected downstream of Folsom Dam in a single year. Reclamation's historical water quality data is available to the Board to better understand the mercury flux in the reservoir.</p>
Pg. 8	<p>Table 5 – Evasion footnote should be footnote “<u>e</u>”</p> <p>Folsom should not be listed as a source of total mercury for Lake Natoma unless there is scientific data to support such a determination. Dr. Slotton's report shows evidence that foothill reservoirs act as sinks for total and methyl mercury.</p>

	<p>There are other sources of runoffs between Folsom Dam and Lake Natoma – City of Folsom overland spills, stormwater runoff from developments, Folsom Prison, etc</p> <p>There are two proposed land development projects (Easton and South of Hwy 50) that will drain into Alder Creek and have potential to alter hydrology.</p>
Pg. 9	<p>Table 6 – Folsom should not be listed as a source for methylmercury unless there is scientific data to support such a determination. Dr. Slotton’s report shows evidence that foothill reservoirs act as sinks for total and methyl mercury.</p> <p>Footnote “e” and “f” – Are the Delta wetland production rates applicable to this ecosystem? Bacteria, temperature, environmental conditions, soil and sediment conditions, and water chemistry are very different from the American River basin.</p> <p>III. Potential Source Control Options – Preliminary Review – “Delta Waters” should be “American River waters”...</p>
Pg. 10	<p>“Potential source control options could focus on reducing: (bullet 3)... Inorganic mercury loading from <u>upstream</u> tributaries to the lake and river; and...”</p>
Pg. 10	<p>Add pH, water hardness, dissolved oxygen, and possibly types of organic content to the list of sediment factors and landscape events important in net methylmercury production and loss.</p>
Pg. 12	<p>Table 7 - Non-point source, open water habitat – Reservoir operations are not easily changed and are dictated by other regulatory agencies such as the U.S. Army Corp of Engineers for flood control, California Department of Fish and Game or National Marine Fisheries Service for flows and temperature requirements. Folsom Reservoir is managed in part to preserve cold water resources for listed salmonids (NMFS BO, June 4, 2009). Changes in dam releases (i.e., flows and circulation patterns) can affect the available cold water pool.</p>
Pg. 13	<p>Table 7 - Urban Runoff (point source): “Modify storm water collection and retention systems to reduce methylmercury production, e.g., installation of aerators or circulation devices in basins may promote degradation of methylmercury in the water column, and identification and removal of sediment from basins would reduce the supply of inorganic mercury available for methylation.” Although this is a good suggestion, how would the Board require public agencies install these devices and who would bear the responsibility to maintain them in perpetuity?</p>
Pg. 13	<p>Table 7 - Wetlands Habitat – When suggesting operational changes to wetlands, the Board also need to consider how management changes will impact the wildlife area - habitat, food source, variety of wildlife, quantity of wildlife?</p>
Pg. 14	<p>3rd bullet – Camanche Reservoir and Almaden Lake are not similar to Folsom in that they are smaller in size not managed to preserve a cold water pool.</p>
Pg. 14	<p>4th Bullet – “Evaluation of the removal, burial, stabilization, and/or other remediation of contaminated sediment in dredge tailings and other mine waste within the lake and river channel.” Does this include the evaluation of upstream abandoned mines as well?</p>

Pg. 14	5th Bullet – Fish Management options. Does the Board have information to indicate that hatchery raised fish are bio-accumulating mercury at a different rate than those raised in the wild? Phase 1 studies could include studies on their (hatchery fish) physiological response to mercury as opposed to endemic species.
Pg. 15	<p>Lake Natoma and Folsom Lake – <u>Stakeholders that drain into the American River watershed will work with reservoir operators</u> to conceivably conduct studies with the following goals:</p> <p>It is also important to understand the methylization pathway in a cold water system to possibly control other factors that contribute to methyl mercury production or encourage routes that lead to de-methylation.</p>
Pg. 15	Nimbus Fish Hatchery and American River Fish Hatchery. See above comment regarding studies of hatchery-raised fish. What is causing the reduced uptake of mercury in the tissues of hatchery fish and is there a relationship to their status as a “hatchery fish”?
Pg. 17	Exposure Reduction – California Department of Health Services is now Department of Public Health.
Pg. 17	Central Valley Water Board. “ <i>Schedule a control program review concurrent with Delta Mercury Control Program review (about 2019).</i> ” Coordination cannot wait until 2019. In order to maximize resources there should be greater coordination with existing and/or new watershed groups to develop load reduction programs for watersheds tributary to the reservoir. How will these TMDLs be coordinated/integrated? Also, what about the rivers that are tributary to the LAR—see page 15, bullet 5.
Pg. 19	<p>Lake Natoma nonpoint sources: Folsom Lake outflow should not be listed a “source” for methylmercury unless proven by scientific data. Dr. Slotton’s report shows evidence that foothill reservoirs do not show a net export of total or methyl mercury but act as sinks.</p> <p>Lower American River nonpoint sources: Lake Natoma is a pass through regulating reservoir and does not contribute to a net increase in methylmercury. The data the Board provided in this straw proposal and previous workshop handouts show that the values in fish tissue were similar for Lake Natoma and the LAR.</p> <p>Include inflows to Lake Natoma as a nonpoint source.</p>
Pg. 20	Aerojet Groundwater Extraction and Treatment Systems (point source). Include data collected by Aerojet in the source load tables (Tables 5 and 6)

Responses to Stakeholder questions raised by RWOCB staff

Page	Comments
Q-1	<p><i>Are there other fish consumption scenarios that should be evaluated? Is there other fish consumption information that staff can incorporate?</i></p> <p>If commercial fish/shellfish consumption is to be factored in when computing the acceptable daily intake levels, it will be important to distinguish if the commercial fish/shellfish were wild or farm-raised. What are the bioaccumulation rates for shellfish vs. fish? These differences should be accounted for when establishing targets. Site specific consumption rates are an important parameter to collect since the demographic in the American River basin are different than the Delta. According to Carrie Monahan with the Sierra Fund, their agency has creel survey data on the American River.</p>
Q-2	<p><i>How would you evaluate target options? What targets would you recommend? If staff does not already have information supporting your recommendation, what information would you use?</i></p> <p>Evaluation of target options may be premature since there are information gaps in identifying sources of mercury, a clear understanding of methylmercury production in cold water systems, and lack of consumption rate information for these water bodies.</p> <p>However, as additional information is obtained and target options are developed, the Board needs to remember that there are many beneficial uses in this water body – Rec, M&I, Cold and Warm water fisheries, habitat, power generation, etc., and some type of methodology is needed to prioritize and balance the competing needs and then determine the appropriate trade-offs when beneficial uses conflict.</p>
Q-3	<p><i>There is a list of citations for the data used in the preliminary source analysis included at the end of this straw proposal. Do you know of other data that could be useful for the source analysis? Do you know of any efforts underway of planned for future to collect additional water, sediment, or fish data in the American River watershed?</i></p> <p>Reclamation has various monitoring programs in Folsom Lake, Lake Natoma, and the lower American River. In addition to water quality data, Reclamation has collected some sediment data on a smaller scale for specific projects. Reclamation also has GIS data for some of the surrounding watershed that would be helpful to identify land ownership or land uses.</p> <p>The Board should also approach Placer County Water Agency (PWCA), El Dorado Irrigation District (EID), and the American River Water Forum for additional data. Also, there are some potential data (currently unpublished) from the USGS such as the Lake Natoma and tributaries fish tissue studies and water quality data (methylmercury data). The USGS point of contact is Charles Alpers. According to Mr. Alpers, the Alder Creek methylmercury report is due for release in at the end of 2010 and would provide valuable information to this process.</p> <p>In addition, Ken Ballard from, Sacramento County Department of Water Resources,</p>

	<p>Stormwater Quality Section indicated that their drainage manager, George Booth, is working with the developers of the Easton Project (Gencorp property) to require some water quality sampling (including methylmercury samples) before development could begin. The development project's receiving waters are Alder and Buffalo Creeks.</p> <p>Alex MacDonald of the Central Valley Regional Water Quality Control Board recently indicated that Aerojet historically collected water quality data for Buffalo and Alder Creeks. This data is available upon request in hard copy form only.</p> <p>A CALSIM model was developed by CH2MHill for the upper watershed that can be used to determine base flows. Although the model is not up to date, it is a tool that can be updates to provide the necessary flow information.</p>
Q-4	<p><i>Can you think of other potential control options besides those listed in Table 7?</i></p> <p>For non-point sources, a house hold hazardous waste collection program targeted at mercury specific waste could reduce available mercury.</p>
Q-5	<p><i>Can you think of other potential studies or implementation activities that would support an adaptive management approach for reducing LAR fish mercury concentrations and exposure?</i></p> <p>To prevent a fragmented and ineffective program, the control program must include the entire watershed and all responsible parties.</p> <p>Understanding the methylation / demethylation process in a cold water system will be useful in determining controllable factors and may lead to alternative solutions.</p> <p>The role of bacteria in the methylation process needs further evaluation and understanding. This could lead to alternative controls that may be more feasible, environmentally and economically.</p> <p>Consider a plan for how changes to the initial load allocations could be streamlined once final studies and management plans are in place.</p>
Q-6	<p><i>Can you provide additional examples of potential environmental impacts that could result from implementation of the control options listed in Table 7 and possible mitigation measures to avoid or reduce impacts? [besides those listed in the above-referenced Delta methylmercury TMDL/BPA report]</i></p> <p>Modification of reservoir operations could impact human health and safety, fishery needs, power generation, and ability for Reclamation to meet downstream requirements (as per recent BOs from NMFS and FWS).</p> <p>Modification of wetlands operations could impact wetland diversity and production.</p>
Q-7	<p><i>Can you provide information about the potential costs of implementing the potential source control options listed earlier in Table 7 and possible ways to reduce those costs? [in addition to those cost estimate methods and cost reduction methods listed in the above- referenced Delta methylmercury TMDL/BPA report]</i></p>

	The control program needs to consider upstream watershed land uses and controlling sediment runoff to control mercury sources. Stopping at Folsom will lead to a program that is fragmented and ineffective.
Q-8	<p><i>Can you suggest possible allocation strategies given the distribution of inorganic and methylmercury source loads and concentrations described earlier in Tables 2 and 3?</i></p> <p><i>Can you suggest other methods to incorporate a margin of safety?</i></p> <p>Reclamation should receive a load allocation credit similar to the credit given to the Westside Exchange Contractors in the Vernalis Salinity and Boron TMDL since the water that Reclamation receives into Folsom is already tainted with mercury.</p>

Comments and Questions from the Public Stakeholder Workshops held in November 2010

Number	Comments
1	A stakeholder at the Auburn workshop made a comment that this TMDL is driven by public health risk due to the consumption of fish with high levels of mercury and suggested the Board allow this TMDL to progress on two tracks; a public health track and a water quality control track. The public health track can allow for actions that will reduce public health risk on a shorter time frame through education and implementation of a catch and release program and while the water quality control track can gather the necessary information on a different time frame to allow for a thorough understanding of the linkages to develop a robust control program that can be used as a template for other similar watersheds.
2	Stakeholders from the Auburn workshop expressed interest in participating in a forum to gather the necessary data to understand the problem and develop an implementable control program. If the Board can facilitate the forum this group can serve two purposes – providing information to the stakeholders but also allow stakeholders to share resources to develop the needed information.
3	Dredge mining activities were discussed at both workshops and there may be some potential for mercury removal through the process. All alternatives should be explored before they are dismissed.
4	At the Placerville meeting atmospheric mercury and its contribution to total mercury in upstream reservoirs was discussed. For example, why do certain reservoirs have higher levels of MeHg when there hasn't been any extensive mining activity in areas upstream? Questions regarding the contribution of atmospheric mercury to total mercury are of interest, especially if the implementation plan will be assigning limits on total mercury in the sediment.